

PATENT
S.N. 10/604,878**REMARKS**

Claims 1-16 and 18-25 were rejected under 35 USC 103(a) as obvious over U.S. 4,207,619 (Klaveness) in view of U.S. 2004/0184348 (Shook et al.). Applicants have canceled claims 1-9 without prejudice and amended claims 10, 13, and 16 to further clarify the invention. Claims 26 -30 have been added. No new matter has been introduced by this amendment.

One aspect of the present invention is the use of surface seismic data in a technique for determining velocities ahead of the drill bit, and further transforming those velocities to determine pore pressures ahead of the bit, as a well is being drilled. The cited references fail to teach or suggest all the limitations of the present invention, alone or combined.

The Office Action states that "Klaveness discloses obtaining surface seismic data for a region of interest" (Page 7, line 4). Applicants disagree. To those of ordinary skill in the art, surface seismic has a well understood meaning - the acquisition of seismic data with a surface source(s) and a surface receiver(s). The prior art is replete with descriptions of surface seismic data (See, e.g., the publication cited in Specification paragraph [0034]). Surface seismic is described and illustrated in the present Specification (See, e.g., Figure 5). Klaveness does not teach or suggest the claimed applications of surface seismic data.

Klaveness describes a seismic measurement technique specifically using a downhole seismic source adjacent to the bit. The data acquisition proposed by Klaveness is a simplistic measurement wherein the downhole source is triggered to make a "noise" measurement at the surface. Expressly missing from Klaveness is any discussion relating to the acquisition of surface seismic data and the use of such data to determine velocities ahead of a drill bit as claimed by Applicants. Klaveness also lacks any discussion relating to the synchronization of measurements.

Shook et al. is further removed from the present invention than Klaveness. Shook et al. describes a seismic data analysis technique addressing amplitude variations for a different purpose compared to Applicants' invention. Expressly missing from Shook et al. is any discussion relating to the determination of velocities ahead of the drill bit using seismic wave travel times and surface seismic data.

Claim 17 was rejected under 35 USC 103(a) as obvious over Klaveness in view of Shook et al. as applied to claims 10-16 and further in view of U.S. 6,131,694 (Robbins et al.). As

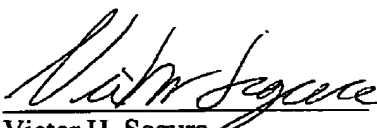
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discussed above, neither Klaveness nor Shook teach or suggest the claimed invention. Though Robbins et al. briefly discusses surface seismic surveys as background (See Column 1), the proposed vertical seismic profiling technique does not entail the use of surface seismic data. In fact, Robbins et al. arguably teaches away from the use of surface seismic data in seismic profiling measurements.

Applicants submit that amended claims 10-17, original claims 18-25, and new claims 26-30 are in condition for allowance and passage to issuance is respectfully requested. If the Examiner believes that a telephone conference would be advantageous in advancing the issuance of this application, a call to the undersigned at (281) 285-4562 is encouraged.

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Respectfully submitted,


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